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An updated checklist of the herpetofauna from Isla María Cleofas, Mexico

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Abstract

We provide an updated checklist of amphibians and reptiles from Isla María Cleofas, Mexico. This island is located at the Islas Marías Archipelago Biosphere Reserve on the coast of the state of Nayarit. The herpetofaunal diversity of Isla María Cleofas has been addressed for over a century; however, the literature is limited just a few scientific explorations and occasional records. In addition, previous herpetofaunal lists contain taxonomic inaccuracies, which are revised here, and recent nomenclatural changes are incorporated. Records of three newly reported species, *Lampropeltis polyzona* Cope, 1860, *Leptophis diplotropis* (Günther, 1872) and *Tantilla calamarina* Cope, 1866, were obtained during our fieldwork. Based on both our field observations and a literature review, the herpetofauna of Isla María Cleofas includes 16 species (two amphibians and 14 reptiles). We also review the conservation status of all species using three independent systems [NOM 059-SEMARNAT-2010, IUCN, and environmental vulnerability score (EVS)]. Finally, we discuss the likely occurrence of evolutionary independent lineages on the island.

Keywords

Amphibians, conservation status, insular environment, Pacific Ocean, reptiles

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Introduction

Efforts to improve our understanding of the herpetofauna of the Mexican Pacific islands have not been homogeneous. For example, Murphy and Aguirre-León (2002) and Case (2002) reviewed the ecology and evolution of reptiles on the islands of the Gulf of California. Zug (2013) published an updated guide of amphibians and reptiles of the Pacific islands but only provided information on the herpetofauna from Revillagigedo Islands. The

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above-referenced studies exclude the Islas Marias Archipelago Biosphere Reserve, which is one of the most herpetological diverse land-bridge islands in the Mexican Pacific (Pliego-Sánchez et al. 2021). To our knowledge, there seems to be a consensus among herpetologists that amphibians and reptiles from the Mexican Central Pacific islands are representatives of taxa found on the adjacent mainland (Zweifel 1960; Casas-Andreu 1992; Woolrich-Piña et al. 2016; Pliego-Sánchez et al. 2021), but they also recognize that different ecological and evolutionary pressures could have influenced morphological and behavioral traits of these insular populations (Rodríguez and Drummond 2000; Senczuk et al. 2014; Siliceo-Cantero et al. 2016; Ramírez-Reyes et al. 2021a).

In the case of the Isla María Cleofas, the first known herpetofaunal collections were made at the end of the 19th century, when only four lizard species were reported: *Anolis nebulosus* (Wiegmann, 1834), *Ctenosaura pectinata* (Wiegmann, 1834), *Aspidoscelis communis* (Cope, 1878), and *Phyllodactylus tuberculosus* Wiegmann, 1834 (Stejneger 1899). In the mid-20th century, two expeditions added to the knowledge of the herpetofauna of the Central Pacific Islands. The first expedition was in 1957, when the American Museum of Natural History funded an expedition to the Baja California Peninsula which also included the Islas Marías and Isla Isabel. The expedition explored the Islas Marías on 23 March–8 April 1957, and specifically Isla María Cleofas was visited on 2–5 April 1957 (Emerson 1958). The herpetologist on that trip was Richard G. Zweifel, who recently died (Cole and Zweifel 2020). During this trip at least nine individuals of *Anolis nebulosus*, one specimen of *Boa sigma* (Smith, 1943) (for taxonomic status, see Card et al. 2016), and one specimen of *Oxybelis microphthalmus* Barbour & Amaral, 1926 (for taxonomic status, see Jadin et al. 2020) were collected and deposited in the collection of herpetology of the American Museum of Natural History.

The Natural History Museum of Los Angeles County supported a second expedition to Islas Marías. More specifically, explorations were conducted in Sinaloa and the Islas Marías in early 1964 (McDiarmid et al. 1976). The collectors of herpetofauna were Roy R. Sneling and James R. Northern. They collected 12 specimens of *A. nebulosus*, three of *Ctenosaura pectinata*, two of *Mastigodryas melanolomus* (Cope, 1868), and one individual of *O. microphthalmus* on the Isla María Cleofas. They also captured a specimen of the snake *Tantilla bocourti* (Günther, 1895), which was the first known record of this species from the Islas Marías (LACM 25251; McDiarmid et al. 1976). In the 1970s, the US Fish and Wildlife Service and México carried out joint faunal inventories in Mexico, mostly in Baja California but also in Sonora, Chihuahua, Aguascalientes, and other states, and Arizona. Teams of biologists, mostly mammalogists and herpetologists, collected specimens from Isla María Madre and other islands of the Islas Marías for the Smithsonian Institution and other museums. During this trip, Scott Norman (2020 pers. comm.) collected the first specimen of *Imantodes gemmistratus* (Cope, 1861) from Isla María Cleofas.

In the 21st century, the María Cleofas Island Conservation Initiative conducted some explorations on this island. During these visits two amphibians were recorded, *Eleutherodactylus pallidus* Duellman, 1958 and *Smilisca baudinii* (Duméril & Bibron, 1841), and for the first time the snake *Rhadinaea hesperia* Bailey, 1940 (Nolasco-Luna et al. 2017). As a result of these explorations, specimens of *Phyllodactylus* were secured on Isla María Cleofas, and it was demonstrated that island populations were genetically isolated from mainland populations (Ramírez-Reyes et al. 2021a, 2021b), which consequently lead to the description of a new species: *P. cleofasensis* (Ramírez-Reyes et al. 2021a). Based on the information mentioned above, we provide an updated checklist of the amphibians and reptiles of Isla María Cleofas, including three new records, description of new species, and taxonomic changes. The present checklist represents the initial step of future work that also includes the identification of biogeographic patterns and enhancement of conservation of amphibians and reptiles in these insular ecosystems.

Study Area

Of the four islands that comprise the Islas Marias Archipelago Biosphere Reserve, Isla María Cleofas, with a surface area of 25 km^2, is the closest to mainland, at approximately 87.5 km to San Blas, Nayarit, on the mainland (Fig. 1). Tropical sub-deciduous and deciduous forests, scrub forest, and a small area of Silver-leaved Buttonwood (*Conocarpus erectus* L.) dominate the vegetation. Climatic conditions on the island are the result of the convergence of the cooler, lower salinity California Current from the north with the northward flowing, warmer Costa Rica Coastal Current, and the cooler, high density, southward flowing Gulf of California Current (Wyrtki 1965; Pennington et al. 2006). Consequently, the island has an average ambient temperature of 24.9 °C, and the minimum and maximum temperatures are 21.1 °C and 28.7 °C in January–February and July, respectively. The mean annual precipitation is 564 mm, and 95% of this rain occurs from June to December (CONANP 2007).

Methods

Literature search. We searched databases such as ISI Web of Science, SciELO Citation Index, BioOne, Science Direct, Scopus, JSTOR, and Redalyc, for records and quantitative data supporting the presence of amphibians and reptiles on Isla María Cleofas. Additionally, we also considered an anecdotal observation available in non-peer-reviewed paper on the occurrence of *Leptophis diplotropis* (Günther, 1872) (Miramontes et al. 2016). Finally, we examined specimens deposited in the Museo de Zoología de la Facultad de Ciencias at

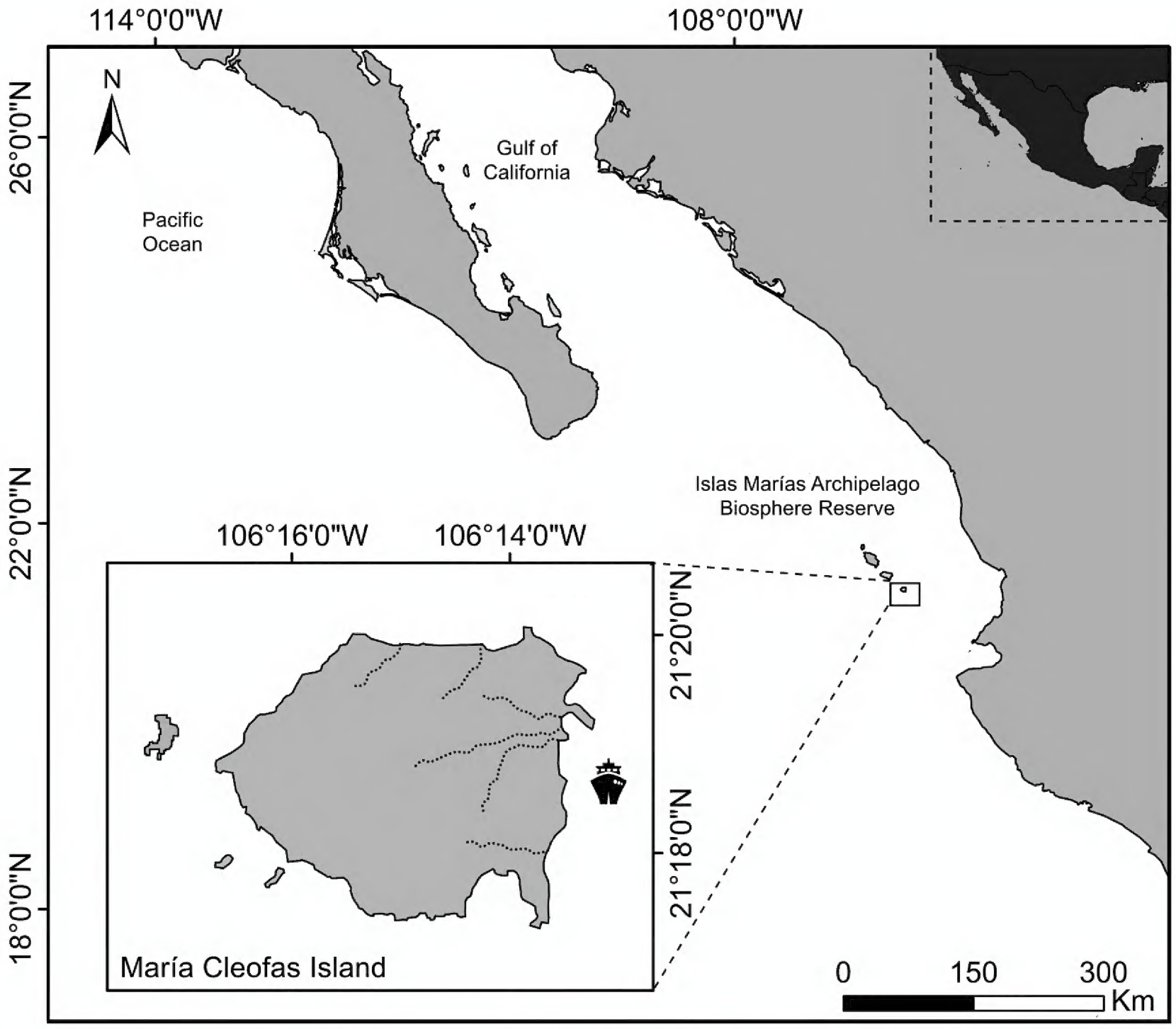

Figure 1. Map showing the transects of diurnal and nocturnal surveys on Isla María Cleofas, Nayarit, Mexico.

Universidad Nacional Autónoma de México (MZFC-HE: Ciudad de México, México), Smithsonian Institution, National Museum of Natural History (USNM: Washington, DC), the Natural History Museum of Los Angeles County (LACM: Los Angeles, California), and the American Museum of Natural History (AMNH: New York, New York).

Fieldwork. We performed diurnal and nocturnal surveys on 22–26 May 2017, 21–25 August 2017, 2–6 April 2018, 21 May–1 April 2018, 2–6 July 2018, and 27–31 August 2018 in all available habitats to assess the herpetofauna of the island. The surveys consisted of 2 or 3 researchers searching for meticulously through various habitats, exploring every microhabitat that could potentially be used by amphibians and reptiles. Our field observations were conducted during the day from 0900 to 1700 h and at night from 2100 to 0400 h. Some species were found under rocks and logs, and some were observed active on the ground or perched on trees. We identified species mainly using the descriptions and identification key by Zweifel (1960). For the new records, three morphological traits were measured: snout–vent length (SVL), from the tip of the snout to the anterior margin of the cloaca; head length (HL), from the tip of the snout to the anterior margin of the ear; and head width (HW), measured at the widest point of head. All measurements were made using digital calipers to the nearest 0.1 mm. Scale counts for snakes were acquired following the procedures of Pérez-Higareda et al. (2007) and Wilson and Mata-Silva (2014). In addition, some species were confirmed by Marco A. López-Luna (Divsión Académica de Ciencias Biológicas, Universidad Juárez Autónoma de Tabasco, Mexico), Vicente Mata-Silva (Department of Biological Sciences, The University of Texas at El Paso, USA), and Tonatiuh Ramírez-Reyes (Facultad de Ciencias, Universidad Nacional Autónoma de México). Photographs from our fieldwork were deposited in the Colección Nacional de Anfibios & Reptiles at Universidad Nacional Autónoma de México (identified here with the coden IBH-RF).

Results

We observed, captured, and/or photographed some of the amphibian and reptile species previously reported from the island. The last checklist had reported only 10 species of reptiles (Casas-Andreu 1992). With the recent published records and the new data provided herein, we add six more species, including two amphibians and four snakes, and two taxonomic changes. To date, the amphibian and reptile diversity of the Isla María Cleofas is represented by two frogs, four lizards, and 10 snakes (Table 1).

Table 1. Amphibians and reptiles reported from Islas Marias Archipelago Biosphere Reserve (María Cleofas, María Madre, María Magdalena, and San Juanito).

Order	Family	Species	María Cleofas	María Madre	María Magdalena	San Juanito
Anura	Bufonidae	*Incilius mazatlanensis* Taylor, 1940		X		
	Eleutherodactylidae	*Eleutherodactylus pallidus* (Duellman, 1958)	X	X	X	
	Hylidae	*Smilisca baudinii* (Duméril & Bibron, 1841)	X	X		
	Microhylidae	*Hypopachus variolosus* (Cope, 1866)		X		
Crocodilia	Crocodylidae	*Crocodylus acutus* (Cuvier, 1807)			X	
Squamata						
Lacertilia	Dactyloidae	*Anolis nebulosus* (Wiegmann, 1834)	X	X	X	X
	Gekkonidae	*Hemidactylus frenatus* Duméril & Bibron, 1836		X		
	Iguanidae	*Ctenosaura pectinata* (Wiegmann, 1834)	X	X	X	X
	Phyllodactylidae	*Phyllodactylus cleofasensis* Ramírez-Reyes, Barraza-Soltero, Nolasco-Luna, Flores-Villela & Escobedo-Galván, 2021	X	X	X	
	Phrynosomatidae	*Urosaurus ornatus* (Baird & Girard, 1852)		X	X	X
	Teiidae	*Aspidoscelis communis* (Cope, 1878)	X	X	X	X
Serpentes	Boidae	*Boa sigma* (Smith, 1943)	X	X	X	
	Colubridae	*Lampropeltis polyzona* Cope, 1860	X	X		
		Leptophis diplotropis (Günther, 1872)	X	X	X	
		Masticophis lineatus (Boucourt, 1890)		X	X	X
		Mastigodryas melanolomus (Cope, 1868)	X	X	X	
		Oxybelis microphthalmus Barbour & Amaral, 1926	X	X	X	
		Tantilla bocourti (Günther, 1895)	X			
		Tantilla calamarina Cope, 1866	X	X		
	Dipsadidae	*Drymarchon melanurus* (Duméril, Bibron & Duméril, 1854)	X	X	X	
		Hypsiglena torquata (Günther, 1860)			X	
		Imantodes gemmistratus (Cope, 1861)	X	X		
		Tropidodipsas annulifera Boulenger, 1894		X		
		Rhadinaea hesperia Bailey, 1940	X			
	Leptotyphlopidae	*Rena humilis* (Baird & Girard, 1853)		X		
	Viperidae	*Agkistrodon bilineatus* Günther, 1863		X	X	X
Testudines	Kinosternidae	*Kinosternon integrum* Le Conte,1854		X		

Class Amphibia
Order Anura
Family Eleutherodactylidae

***Eleutherodactylus pallidus* (Duellman, 1958)**
Figure 2A

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3165°N, 106.2302°W; elev. 15 m; 22.VIII. 2017; Jose Rafael Nolasco-Luna obs.; 1♂, IBH-RF-458 (photograph).

The specimen was found at night while calling on leaf litter after a rain event.

Identification. The tiny frog was identified as a member of the *E. modestus* group by having the tympanic annuli indistinct or invisible, and digital tips on fingers 3 and 4 expanded twice or more the narrowest part of finger (Duellman 1958; Zweifel 1960; Grünwald et al. 2018).

Remarks. Previously, Zweifel (1960) had collected seven specimens from Isla María Magdalena and six from Isla María Madre. This species is endemic to Mexico, placed in the special protection category by the Mexican Official Norm 059-SEMARNAT-2010 (Chávez-Avila et al. 2014); however, it is Data Deficient in the IUCN Red List (Santos-Barrera and Flores-Villela 2004). Wilson et al. (2013a) gave this species a high environmental vulnerability score (EVS = 17).

Family Hylidae

***Smilisca baudinii* (Duméril & Bibron, 1841)**
Figure 2B

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3159° N, 106.2328° W; elev. 15 m; 22.VIII. 2017; Jose Rafael Nolasco-Luna obs.; 1♀, IBH-RF-457 (photograph).

This tree frog was found at night perched on a trunk 130 cm from the ground.

Identification. The Mexican tree frog was identified by external morphological traits such as body sizes, color patterns and the reduced webbing on the hind foot (McCranie 2017).

Remarks. Casas-Andreu (1992) reported the occurrence of this species at Isla María Madre. IUCN allocated the Mexican Tree Frog in the Least Concern category (Santos-Barrera et al. 2010), and Wilson et al. (2013a) gave it a low environmental vulnerability score (EVS = 3).

Class Reptilia
Order Squamata (Lacertilia)
Family Dactyloidae

***Anolis nebulosus* (Wiegmann, 1834)**
Figure 3A

Material examined. MEXICO – Nayarit • Isla María Cleofas; 20.3253 °N, 106.2472°W; elev. 190 m; 22.V.2017;

Figure 2. Species of amphibians found at Isla María Cleofas, Nayarit, México. **A.** *Eleutherodactylus pallidus* (Duellman, 1958). **B.** *Smilisca baudinii* (Duméril & Bibron, 1841).

Manuel Alejandro López-Montes obs.; 1♂, IBH-RF-701 (photograph).

The lizard was perched on the trunk of *Piranhea mexicana* (Standl.) Radcl.-Sm., with a diameter at breast height of 0.42 cm and at perch height of 138 cm. The SVL was 48.9 mm; HL was 13.0 mm, and HL was 7.8 mm.

Identification. *Anolis nebulosus* was identified based on external morphological diagnostic traits. The individual showed a large dewlap with colors ranging from yellow-orange to orange-red with a white edge, and it also had a crest along the top of the body (Jenssen 1970).

Remarks. The first specimens of *A. nebulosus* from Isla María Cleofas were collected by E.W. Nelson and E.A. Goldman in 1897 (Stejneger 1899). For the taxonomic status of this species, see Nicholson et al. (2018). Wilson et al. (2013b) gave this species a medium environmental vulnerability score (EVS = 13). Interestingly, the conservation status of this species has not been assessed either by SEMARNAT or by the IUCN.

Family Iguanidae

***Ctenosaura pectinata* (Wiegmann, 1834)**
Figure 3B

Material examined. MEXICO – Nayarit • Isla María Cleofas; 22.33165°N, 106.2422°W; elev. 266 m; 3.IV.2018. Jose Rafael Nolasco-Luna obs.; 1♂, IBH-RF-703 (photograph).

The black iguana was perched on a tree log.

Identification. This species was identified based on the tail features, which show spiny scales separated by whorls of small scales. Young exhibit varied body color which ranges from green to brown/black with gray mottling, while adults show a homogeneous dark color or with some orange mottling (Zweifel 1960).

Remarks. The first individual from Isla María Cleofas (USNM 24630) was mentioned by Stejneger (1899). However, Zweifel (1960) did not report additional information from Isla María Cleofas. This species is endemic to Mexico and currently is assessed as Threatened by NOM-059-2010. It has not been evaluated by the IUCN, but Wilson et al. (2013b) gave this species a high environmental vulnerability score (EVS = 15).

Family Phyllodactylidae

***Phyllodactylus cleofasensis* Ramírez-Reyes, Barraza-Soltero, Nolasco-Luna, Flores-Villela & Escobedo-Galván, 2021**
Figure 3C

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3090°N, 106.2330°W; elev. 64 m; 24.V.2018; Ilse K. Barraza-Soltero leg.; sex undetermined, MZFC-HE-35619.

The gecko was found at night perched on a rock. The specimen is part of the type material deposited.

Identification. Recently, this species was described based on molecular and morphological evidence. The number of paravertebral dorsal tubercles from head to tail, the number of scales across the snout, and the number of longitudinal ventral scales from an imaginary line of the forelimbs to the cloacal opening differentiate *P. cleofasensis* from mainland and other island species of *Phyllodactylus* (Ramírez-Reyes et al. 2021a).

Remarks. There has been some taxonomic confusion about the presence of *Phyllodactyulus* on the Islas Marías. Stejneger (1899) collected one individual from Isla María Cleofas and two from Isla María Madre, and assigned these to *P. tuberculosus*. Zweifel (1960) collected additional individuals from Isla María Madre and Isla María Magdalena, and he reported them as *Phyllodactylus lanei* Smith, 1935. Dixon (1964) described *Phyllodactylus tuberculosus saxatilis* Dixon, 1964. Recently, Ramírez-Reyes et al. (2020, 2021b) studied the genus *Phyllodactylus* and showed that *P. t. saxatilis* actually represents a species complex formed by three non-monophyletic species. Therefore, Ramírez-Reyes et al. (2021a) described the gecko population from Isla María Cleofas as a separate, endemic species.

Family Teiidae

***Aspidoscelis communis* (Cope, 1878)**
A. c. mariarum (Günther, 1885)
Figure 3D

Material examined. MEXICO – Nayarit • Isla María

Figure 3. Reptiles found at Isla María Cleofas. **A.** *Norops* (*Anolis*) *nebulosus* (Wiegmann, 1834). **B.** *Ctenosaura pectinata* (Wiegmann, 1834). **C.** *Phyllodactylus cleofasensis* Ramírez-Reyes et al., 2021. **D.** *Aspidoscelis communis* (Cope, 1878). **E.** *Boa sigma* (Smith, 1943). **F.** *Lampropeltis polyzona* Cope, 1860. **G.** *Leptophis diplotropis* (Gunther, 1872). **H.** *Mastigodryas melanolomus* (Cope, 1868). **I.** *Oxybelis microphthalmus* (Wagler, 1824). **J.** *Tantilla bocourti* (Günther, 1895). **K.** *Tantilla calamarina* Cope, 1866. **L.** *Rhadinaea hesperia* Bailey, 1940.

Cleofas; 21.3232°N, 106.2359°W; elev. 61 m; 3.IV.2018. Jose Rafael Nolasco-Luna obs.; sex undetermined, IBH-RF-704 (photograph).

The whiptail lizard was observed foraging on leaf litter at 1100 h in tropical deciduous forest.

Identification. This species was identified based on body coloration, the juveniles observed and captured show stripes on a dark brown ground color and an orange-brown tail. Adults exhibit some spots on the posterior part of the body, dark fields with cross bars anteriorly, and the abdomen is dark blue in some individuals (Duellman and Zweifel 1962).

Remarks. Populations of this whiptail species were distributed as an endemic subspecies from the Islas Marías. Stejneger (1899) and Zweifel (1960) collected individuals from Isla María Cleofas. This species is placed in the special protection category by NOM-059-2010. Wilson et al. (2013b) gave this species a high environmental vulnerability score (EVS = 14), but Ponce-Campos and García (2007a) assessed this species as Least Concern in the IUCN Red List.

Order Squamata (Serpentes)
Family Boidae

***Boa sigma* (Smith, 1943)**
Figure 3E

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3276°N, 106.2311°W; elev. 25 m; 28.VIII.2018; Jose Rafael-Nolasco Luna obs.; 1♂, IBH-RF-705 (photograph), SVL 190 cm.

Identification. The ventral scales of the only specimen captured during our expeditions on Isla María Cleofas numbered 255. Smith (1943) described three specimens, which he identified as *Constrictor constrictor sigma*, from the Islas Marías as having a greater number of ventral scales (258 or 259).

Remarks. Based on mitochondrial sequences and genome-

wide SNP data, Card et al. (2016) recently recognized the Mexican populations along the Pacific coast of the Isthmus of Tehuantepec as *B. sigma*. Importantly, these authors only included sequences from mainland populations; therefore, we consider that the taxonomic status of insular populations still remains understudied. Johnson et al. (2017) gave this species a high environmental vulnerability score (EVS = 15). To date, this species has not been assessed by either SEMARNAT or IUCN.

Family Colubridae

***Drymarchon melanurus* (Duméril, Bibron & Duméril, 1854)**

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3186°N, 106.2274°W; elev. 5 m; 23.IV.2017; Manuel Alejandro López-Montes obs. (no photograph).

Only one individual was observed during diurnal surveys at 0900 h in a tropical deciduous forest.

Identification. This species was identified based on the dark coloration on the dorsal body and pink coloration on the ventral and lateral scales. Some animals from Isla María Cleofas are deposited in the American Museum of Natural History (Zweifel 1960).

Remarks. Between 1941 and 1942, two subspecies, *D. corais rubidus* and *D. corais cleofae*, were described. However, Bogert and Oliver (1945) relegated *D. c. cleofae* to a synonym of *D. c. rubidus*. Subsequent studies considered *D. c. rubidus* as the species endemic to the Marías archipelago (Zweifel 1960; Casas-Andreu 1992). *Drymarchon corais* and *D. melanurus* have been considered as synonyms; however, Wüster et al. (2001) demonstrated that *D. melanurus* and *D. corais* are different taxonomic units based on scale and color pattern characters. Thus, the species in Mexico is recognized as *D. melanurus*. Further integrative taxonomic approaches using a combination of molecular and morphological data will improve our understanding on the taxonomic status of *D. melanurus*, not only between the continent and the islands, but also among islands. The IUCN Red List has this species as Least Concern (Gutiérrez-Cárdenas and Rivas 2017), and Wilson et al. (2013b) gave this species a low environmental vulnerability score (EVS = 6). However, this species has not been evaluated by SEMARNAT.

***Lampropeltis polyzona* Cope, 1860**

Figure 3F

New record. MEXICO – Nayarit • Isla María Cleofas; 22.3250°N, 106.2558°W; elev. 118 m; 6.VII.2018. Jose Rafael Nolasco-Luna obs.; 1♀, IBH-RF-554 (photograph).

The snake was observed active on leaf litter in tropical deciduous forest at approximately 0100 h. The SVL was 100.0 cm; tail length was 14.0 cm. The relative tail length was 0.12.

Identification. *Lampropeltis polyzona* was identified using the taxonomic keys of Smith and Taylor (1945) and Zweifel (1960) and based on the following characteristics: snout yellow; body with black, white, and red rings. The scutellation of the individuals is as follow: 230 ventrals, 54 subcaudals (total count = 284), 7 supralabials, 9 infralabials, 1 preocular, 2 postoculars, which are consistent with morphological and scutellation data from individuals from the adjacent islands of Isla Isabel and Isla María Madre (Zweifel 1960; Rodríguez and Drummond 2000) and mainland populations (Pérez-Higareda et al. 2007).

Remarks. Casas-Andreu (1992) recommended the name *L. triangulum nelsoni* for the population of Isla Isabel, and the name *L. triangulum shmidti* for that from Isla María Madre, and suggested that these populations could represent different species. Ruane et al. (2014) recognized *L. polyzona* based on mtDNA from the Mexican states of Colima, Guerrero, Hidalgo, Jalisco, Puebla, Michoacán, Oaxaca, Sinaloa, Sonora, and Veracruz (for taxonomic status, see Chambers and Hillis 2020). However, the current taxonomic status of this species in Pacific insular ecosystems remains unclear. Johnson et al. (2017) gave this species a medium environmental vulnerability score (EVS = 11). This species remains to be evaluated by both SEMARNAT and IUCN.

***Leptophis diplotropis* (Günther, 1872)**

Figure 3G

New records. MEXICO – Nayarit • Isla María Cleofas; 21.3226°N, 106.2352°W; elev. 55 m; 2.VII.2018; Jose Rafael Nolasco-Luna obs.; sex undetermined, IBH-RF-555 • Isla María Cleofas; 21.3306° N, 106.2547° W; elev. 27 m; 3.VII.2018; Jose Rafael Nolasco-Luna obs.; no photograph.

The snake observed on 2.VII. 2018 was active at 1500 h. Its SVL was 70.9 cm, the tail length was 40.8 cm, and the relative tail length (tail length/SVL) was 0.37. The second individual was observed on a dead tree in a dry stream. The SVL was 80.8 cm, the tail length was 52.5 cm, and the relative tail length was 0.40.

Identification. The specimen was identified using the taxonomic keys of Smith and Taylor (1945) and Ramírez-Bautista (1994). The characteristics that distinguish it are a predominant color green with a dark stripe on the side of head and neck that is interrupted before it disappears posteriorly. Scutellation of the individuals is as follows: 188 or 189 ventrals, 147–177 subcaudals (total count = 335–366), 7 or 8 supralabials, 10–12 infralabials, 1 preocular, and 2 postoculars, which are consistent with data reported by Ramírez-Bautista (1994).

Remarks. Smith (1943) described *L. diplotropis forreri* as a new subspecies from the Islas Marías; however, the current subspecific status remains understudied. Future molecular studies could support the occurrence of evolutionarily independent unit from the Islas Marías. *Leptophis diplotropis* is endemic to Mexico and considered to be threatened by NOM-059-2010 It has high environmental vulnerability according to Wilson et al. (2013b).

However, it was assessed as Least Concern by the IUCN (Ponce-Campos and García-Aguayo 2007b).

***Mastigodryas melanolomus* (Cope, 1868)**
Figure 3H

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3228°N, 106.2296°W; elev. 5 m; 5.VII.2018; Jose Rafael Nolasco-Luna obs.; 1♂, IBH-RF-706 (photograph).

The snake was captured during diurnal surveys at 1000 h in tropical deciduous forest. The SVL was 55.7 cm.

Identification. The scutellation of the individual is as follow: 185 ventrals, 88 subcaudals (the tail was detached during manipulation), 8 supralabials, 7 infralabials, 1 preocular, and 1 postocular, which is consistent with data reported by Pérez-Higareda et al. (2007).

Remarks. Zweifel (1960) collected the first record for Isla María Cleofas but identified it as *Dryadophis melanolomus slevini* (AMNH 78728). Dixon and Tipton (2004) concluded that *Dryadophis* and *Mastigodryas* should be relegated to a single genus, with *Mastigodryas* as the senior synonym. This species was assessed as Least Concern by the IUCN (Lee et al. 2013), and Wilson et al. (2013) gave it a low environmental vulnerability score (EVS = 6). However, its conservation status has not been assessed by SEMARNAT.

***Oxybelis microphthalmus* Barbour & Amaral, 1926**
Figure 3I

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3225°N, 106.2294°W; elev. 11 m; 3.IV.2018; Ilse K. Barraza-Soltero obs.; 1♀, IBH-RF-707 (photograph).

The snake was perched in a tree fissure.

Identification. This species was identified based on its slender body, elongated head, large eyes, long tail, and diurnal behavior (Ramírez-Bautista 1994; Pérez-Higareda et al. 2007).

Remarks. Stejneger (1899) collected one individual of this species from Isla María Madre and deposited it in the US National Museum (USNM 24673). However, Zweifel (1960) collected the first record from the María Cleofas Island, and it was identified as *Oxybelis aeneus auratus* (AMNH 78731). Mata-Silva et al. (2021) gave this species a medium environmental vulnerability score (EVS = 11). It has not been assessed by either the IUCN or SEMARNAT. Recently, Jadin et al. (2019) discussed the existence of at least four evolutionary independent units for *O. aeneus* (Wagler, 1824), Their molecular analysis included only the insular population of *O. aeneus* from Isla Coiba, Panama. Jadin et al. (2020) recognized *Oxybelis microphthalmus* as a separate species from *O. aeneus*, with distribution southeastern Arizona throughout western Mexico to Oaxaca, and consequently it would be expected to be the species present in Nayarit and the Islas Marías. An integrative taxonomic approach, using a combination of molecular and morphology data would further improve our understanding of the distribution and taxonomic status of *O. microphthalmus*, not only from the Isla María Cleofas but also the other islands.

***Tantilla bocourti* (Günther, 1895)**
Figure 3J

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3095°N, 106.2340°W; elev. 64 m; 4.IV.2018; Eduardo Ismael Huerta-de la Barrera obs.; 1♀, IBH-RF-465 (photograph).

The snake was found under a tree trunk in leaf litter in tropical deciduous forest.

Identification. McDiarmid et al. (1976) indicated that the female specimen (LACM 25251) had 171 ventrals and 45 subcaudals (total count = 216). The specimen examined has 172 ventrals and 54 subcaudals (total count = 226). We compared the scutellation of our specimen with the data provided by Wilson and Mata-Silva (2014) and McDiarmid et al. (1976), and it and other morphological data from our specimen falls within the ranges reported for this species from the mainland.

Remarks. *Tantilla bocourti* is one of 31 *Tantilla* species known from Mexico, one of the 17 Mexican endemic species, and the one with the broadest distribution in the country (Wilson and Mata-Silva 2014; Herr et al. 2017). For a long time, only a female specimen of *T. bocourti* had been reported from Isla María Cleofas (McDiarmid et al. 1976). Based on fieldwork conducted from 2–6 April 2018, a second specimen was collected. This specimen represents the rediscovery of the species from Isla María Cleofas (Nolasco-Luna et al. 2019). *Tantilla bocourti* was assessed as Least Concern by the IUCN (Flores-Villela 2007), and Wilson et al. (2013b) gave this species a low environmental vulnerability score (EVS = 9).

***Tantilla calamarina* Cope, 1866**
Figure 3K

New record. MEXICO – Nayarit • Isla María Cleofas; 21.3306°N, 106.2547°W; elev. 33 m; 2.VII.2018; Jose Rafael Nolasco-Luna obs.; 1 individual, sex undetermined, IBH-RF-556 (photograph) • Isla María Cleofas; 21.3238° N, 106.253° W; elev. 55 m; 2.VII.2018. Jose Rafael Nolasco-Luna, obs.; 1 individual, sex undetermined, not photographed.

The snake observed on 2.VII. 2018 was observed and photographed under a rock at 1200 h. The SVL was 13.2 cm, the tail length was 2.1 cm, and the relative tail length 0.12. The second snake was observed about 10 m from the first individual. The SVL was 15.4 cm, the tail length 2.5 cm, and the relative tail 0.16.

Identification. The scutellation of the two individuals is shown in Table 2 and compared with the data provided by Wilson and Mata-Silva (2014) and Ramírez-Bautista et al. (2014). In general, the scutellation of individuals from Isla María Cleofas fall within the ranges reported for this species on the mainland.

Table 2. Range of morphological characters in *Tantilla calamarina* from Isla María Cleofas and mainland populations.

Character	Wilson and Mata-Silva 2014	Ramírez-Bautista et al. 2014	This study
Individuals analyzed (*n*)	56	135	2
Tail length/total length (%)	0.11–0.21	0.12–0.23	0.12–0.16
Ventrals	106–140	110–128	119–128
Subcaudals	22–43	25–39	26–30
Ventrals + Subcaudals	145–179	147–162	149–154
Postoculars	1	—	1
Supralabials	Usually 6	Usually 6	6

Remarks. Zweifel (1960) collected an individual of this species from Isla María Madre, and it was deposited in the American Museum of Natural History (AMNH 78745). Our study represents the first record of *T. calamarina* from Isla María Cleofas. This species is endemic to Mexico. The NOM-059-2010 categorized this species as needing special protection, the IUCN Red List assessed it as Least Concern (Ponce-Campos and García-Aguayo 2007c), and Wilson et al. (2013b) gave this species a medium environmental vulnerability score (EVS = 12).

Family Dipsadidae

***Imantodes gemmistratus* (Cope, 1861)**
Figure 4

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.27°N, 106.14°W; 20.III.1976; Norman J. Scott leg.; 1 specimen, undetermined sex, USNM 237779.

The SVL of this specimen was 790 mm, and the tail length was 327 mm. The ratio of tail length/body size was 0.41. The head length and head width were 13.0 mm and 7.0 mm, respectively. The scutellation of the individual is as follows: 256 ventrals and 143 subcaudals.

Identification. The meristic and morphological data fall within the mainland ranges reported for this species (Zweifel 1959).

Remarks. Forrer collected the first record of *I. gemmistratus* from the Islas Marías Archipelago Biosphere Reserve (Boulenger 1896). Additionally, Zweifel (1960) mentioned this species from the Islas Marías Archipelago Biosphere Reserve based on a single specimen possibly collected on Isla María Madre. For a taxonomic discussion of subspecies in western Mexico see Zweifel (1959). The IUCN Red List assessed this species as Least Concern (Köhler and Nicholson 2017). Wilson et al. (2013b) gave this species a low environmental vulnerability score (EVS = 6).

Figure 4. Specimen of *Imantodes gemmistratus* (Cope, 1861) collected at Isla María Cleofas.

***Rhadinaea hesperia* Bailey, 1940**
Figure 3L

Material examined. MEXICO – Nayarit • Isla María Cleofas; 21.3163°N, 106.2354°W; elev. 30 m; 22.VIII.2017; Jose Rafael Nolasco-Luna obs.; sex undetermined, IBH-RF-459.

The snake was found during a diurnal survey in a dry stream between leaf litter and some shrubs.

Identification. This species was identified based on color pattern and number of ventral and caudal scales using the dichotomic key by Myers (1974).

Remarks. The NOM-059-2010 cataloged this snake as needing special protection, the IUCN Red List assessed it as Least Concern (Canseco-Márquez and Mendoza-Quijano 2007), and Wilson et al. (2013b) gave it a medium environmental vulnerability score (EVS = 10).

Discussion

Our study shows the increase in knowledge of the herpetofaunal diversity on Isla María Cleofas since the first scientific collecting trips by E.W. Nelson and E.A. Goldman in 1897, who only reported lizard species. Since then, snake species were recorded by two expeditions in the mid-20th century. Thus, a century after the first records, the known alpha diversity on Isla María Cleofas included only squamate species (four lizards and six snakes); however, our explorations have found the herpetofauna to be more diverse than had been previously known.

Based on our results, *Lampropeltis polyzona* and *Tantilla calamarina* are reported for the first time at Isla María Cleofas. Importantly, Miramontes et al. (2016) observed *Leptophis diplotropis* during a visit to the island; however, we are not aware of if any specimen or photographic material were deposited in a scientific collection. Therefore, we provide here the first verified record of *L. diplotropis* from the Isla María. Additionally, we studied and morphologically describe here the

only specimen (USNM 237779) of *Imantodes gemmistratus* from Isla María Cleofas.

Marine reptile species were not included in this updated checklist. These include the sea turtles *Eretmochelys imbricata* (Linnaeus, 1766) and *Chelonia mydas* (Linnaeus, 1766), as well as Yellow-Bellied Sea Snake, *Hydrophis platurus* (Linnaeus, 1766). However, these species are likely present throughout the archipelago (Casas-Andreu 1990, 1997). We observed carcasses of sea turtles on some beaches, but we were unable to determine if the carcasses were deposited there by sea currents or if the specimens died on the beach under natural conditions. We did not observe tracks of nesting female turtles around the island, but this may be because our trips did not coincide to nesting season.

The paleogeographic reconstructions of Western Mexico suggest that the Islas Marías were separated from the mainland during the formation of the Gulf of Cortés, between 10 and 3 Ma ago (Murphy and Aguirre-León 2002). Although the biogeographic processes of the archipelago remain unknown, it is assumed that they were important in the development of the herpetolofaunal diversity on each island. For example, two amphibians and nine reptile species have been reported on other islands of the archipelago but not on Isla María Cleofas (Table 1). This list of species underscores the need for increased efforts to acquire better information on the alpha diversity in the Islas Marías archipelago.

The different environmental conditions on each of the islands (Zweifel 1960) also makes this endeavor of greater interest. Isla María Madre is the largest island in the archipelago and in some areas has persistent wet conditions throughout the year, which increases the possibility of finding species such as aquatic reptiles and amphibians requiring such conditions (Zweifel 1960; Casas-Andreu 1992). These conditions have not been found on Isla María Cleofas, which suggest that the occurrence of *Agkistrodon bilineatus* and *Kinosternon integrum* on this island is unlikely.

The lizard *Urosaurus ornatus* is another species that has been collected from other islands but not reported from Isla María Cleofas. The southern limit of this species' distribution is on Isla María Magdalena, which is 16 km from Isla María Cleofas. Zweifel (1960) proposed that *Urosaurus ornatus* reached most of the Islas Marías archipelago by dispersal over water from mainland populations in Sinaloa. Recent studies of the genomics and phylogenomics of leaf-toed geckos (genus *Phyllodactylus* Gray, 1828), showed that *P. cleofasensis* diverged from mainland populations about 7 Ma ago (Ramírez-Reyes et al. 2020, 2021a), but, most surprisingly, its sister species is *P. saxatilis* (Dixon, 1964) from Villa Unión, Sinaloa. All of this suggests that the reptile diversity in the archipelago is more complex than has been previously envisioned.

Isla María Cleofas may have gone through at least two biogeographic processes. The first was the isolation at the time of land-bridge island formation transporting some species, and the second process of colonization was from some reptile populations coming from the northern regions inside the Gulf of Cortés. For example, *L. polyzona* occurs on mainland and on Islas Marías, Isla Isabel, and Islas Marietas, the principal islands off Nayarit, but the colonization process is unknown. Systematic sampling and molecular analyses should improve our understanding of the biogeographic processes and possible gene flow between the islands of the Islas Marías Archipelago, adjacent islands, and the mainland. Molecular analyses can also help confirm the taxonomic diversity of amphibians and reptiles and reveal the existence of evolutionary independent lineages, such recently discovered for *Phyllodactylus cleofasensis*, which is currently the only endemic species known from the archipelago.

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Authors' Contributions

Conceptualization: AHEG, JRNL. Data curation: JRNL, AHEG, IKBS. Formal analysis: JRNL, AHEG, IKBS. Funding acquisition: AHEG. Investigation: MALM, AHEG, JRNL, JAML, IKBS. Methodology: JAML, AHEG, IKBS, JRNL, MALM. Project administration: AHEG. Writing – original draft: IKBS, AHEG, JRNL. Writing – review and editing: IKBS, JRNL, AHEG.

References

Bogert CM, Oliver JA (1945) A preliminary analysis of the herpetofauna of Sonora. Bulletin of the American Museum of Natural

History 83: 297–426.
Boulenger GA (1896) Catalogue of the snakes in the British Museum, Vol. 3. Taylor & Francis, London, UK, xiv + 727 pp.
Canseco-Márquez L, Mendoza-Quijano F (2007) *Rhadinaea hesperia*. The IUCN Red List of threatened species 2007: e.T63894A12719022.
Casas-Andreu G (1990) Geographic distribution: *Pelamis platurus*. Herpetological Review 21 (1): 41.
Casas-Andreu G (1992) Anfibios y reptiles de las islas Marías y otras islas adyacentes de la costa de Nayarit, México. Aspectos sobre su biogeografía y conservación. Anales del Instituto de Biología, Universidad Nacional Autónoma de México, Serie Zoología 63: 95–112.
Casas-Andreu G (1997) Distribución de la culebra de mar *Pelamis platurus* en el Pacífico Mexicano. Revista de la Sociedad Mexicana de Historia Natural 47: 157–166.
Card DC, Schield DR, Adams RH, Corbin AB, Perry BW, Andrew AL, Pasquesi GIM, Smith EN, Jezkova T, Boback SM, Booth W, Castoe TA (2016) Phylogeographic and population genetic analyses reveal multiple species of *Boa* and independent origins of insular dwarfism. Molecular Phylogenetics and Evolution 102: 104–116. http://doi/10.1016/j.ympev.2016.05.034
Case TJ (2002) Reptiles: Ecology. In: Case TJ, Cody ML, Ezcurra E (Eds.) A new island biogeography of the Sea Cortés. Oxford University Press, New York, USA, 221–270.
Chávez-Ávila SM (2014) Análisis espacial y conservación de los anfibios y reptiles del estado de Jalisco. Tesis de Maestría, Posgrado en Ciencias Biológicas, Universidad Nacional Autónoma de México, Ciudad de México, México, 83 pp.
Chambers EA, Hillis DM (2020) The multispecies coalescent oversplits species in the case of geographically widespread taxa. Systematic Biology 69: 184–193. https://doi.org/10.1093/sysbio/syz042
Cole CJ, Zweifel MK (2020) Life history and behavior of Richard George Zweifel (1926–2019). Herpetological Review 51: 189–193.
CONANP-Comisión Nacional de Áreas Naturales Protegidas (2007) Programa de conservación y manejo, reserva de la biosfera islas Marías. México, Comisión Nacional de Áreas Naturales Protegidas, Ciudad de México, México, 216 pp.
De la Torre JA, López-Damián LJ, Bárcenas HV, Nájera-Solís E, Medellín RA (2010) New record of sheep frog (*Hypopachus variolosus*) in the Tres Marías Islands archipelago, Nayarit, Mexico. Revista Mexicana de Biodiversidad 81: 581–582.
Dixon JR (1964) The systematics and distribution of lizards of the genus *Phyllodactylus* in North and Central America. New Mexico State University Science Bulletin 64 (1): 1–145.
Dixon JR, Tipton BL (2004) *Dryadophis* versus *Mastigodryas* (Ophidia: Colubridae): a proposed solution. Herpetological Review 35: 347–349.
Duellman WE (1958) A review of the frogs of the genus *Syrrhophus* in western Mexico. Occasional Papers of the Museum of Zoology, University of Michigan 594: 1–25.
Duellman WE, Zweifel RG (1962) A synopsis of the lizards of the sexlineatus group (Genus *Cnemidophorus*). Bulletin of the American Museum of Natural History 123: 155–210.
Emerson WK (1958) Results of the Puritan–American Museum of Natural History Expedition to western Mexico. 1. General account. American Museum Novitates 1894: 1–25.
Flores-Villela, O. (2007) *Tantilla bocourti*. The IUCN Red List of threatened species 2007: e.T63936A12729747.
Grünwald CI, Reyes-Velasco J, Franz-Chávez H, Morales-Flores KI, Ahumada-Carrillo IT, Jones JM, Boissinot S (2018) Six new species of *Eleutherodactylus* (Anura: Eleutherodactylidae: subgenus *Syrrhophus*) from Mexico, with a discussion of their systematic relationships and the validity of related species. Mesoamerican Herpetology 5: 7–83.
Gutiérrez-Cárdenas P, Rivas G (2017) *Drymarchon melanurus*. The IUCN Red List of threatened species 2017: e.T63774A3129309.
Herr MW, Giovanetto LA, Black M, Hernadez JC, Mendoza-Pérez MR, Graham SP (2017) Geographic distribution. *Tantilla cucullata* (Trans-Pecos Black-headed Snake). Herpetological Review 48 (4): 816.
Jadin RC, Blair C, Jowers MJ, Carmona A, Murphy JC (2019) Hiding in the lianas of the tree of life: molecular phylogenetics and species delimitation reveal considerable cryptic diversity of New World Vine Snakes. Molecular Phylogenetics and Evolution 134: 61–65. https://doi.org/10.1016/j.ympev.2019.01.022
Jadin RC, Blair C, Orlofske SA, Jowers MJ, Rivas GA, Vitt LJ, Ray JM, Smith EN, Murphy JC (2020) Not withering on the evolutionary vine: systematic revision of the Brown Vine Snake (Reptilia: Squamata: *Oxybelis*) from its northern distribution. Organisms Diversity & Evolution 20: 723–746. https://doi.org/10.1007/s13127-020-00461-0
Jenssen TA (1970) The ethoecology of *Anolis nebulosus* (Sauria, Iguanidae). Journal of Herpetology 4: 1–38.
Johnson JD, Wilson LD, Mata-Silva V, García-Padilla E, DeSantis DL (2017) The endemic herpetofauna of Mexico: organisms of global significance in severe peril. Mesoamerican Herpetology 4: 544–620.
Köhler G, Nicholson K (2017) *Imantodes gemmistratus*. The IUCN Red List of threatened species 2017: e.T197490A2489820.
Lee J, Calderón Mandujano R, López-Luna MA, Stafford PJ (2013) *Mastigodryas melanolomus*. The IUCN Red List of threatened species 2013: e.T63851A3130254.
Mata-Silva V, García-Padilla E, Rocha E, DeSantis DL, Johnson JD, Ramírez-Bautista A, Wilson LD (2021) A reexamination of the herpetofauna of Oaxaca, Mexico: composition update, physiographic distribution, and conservation commentary. Zootaxa 4996: 201–252. https://doi.org/10.11646/zootaxa.4996.2.1
McCranie JR (2017) Morphological and systematic comments on the Caribbean lowland population of *Smilisca baudinii*, (Anura: Hylidae: Hylinae) in northeastern Honduras, with the resurrection of *Hyla manisorum* Taylor. Mesoamerican Herpetology 4: 513–526.
McDiarmid RW, Copp JF, Breedlove DE (1976) Notes on the herpetofauna of western Mexico: new records from Sinaloa and the Tres Marías Islands. Natural History Museum of Los Angeles County Contributions in Science 275: 1–17.
Miramontes E, Cruz J, Cortes M (2016) Herpetofauna de la isla María Cleofás archipiélago islas Tres Marías. In: XIV Reunión Nacional de Herpetología, Tepic, Nayarit, México, 60.
Murphy RW, Aguirre-León G (2002) The nonavian reptiles: origins and evolution. In: Case TJ, Cody ML, Ezcurra E (Eds.) A new island biogeography of the Sea of Cortes. Oxford University Press, New York, USA, 181–220.
Myers CW (1974) The systematics of *Rhadinaea* (Colubridae), a genus of new world snakes. Bulletin of the American Museum of Natural History 153: 1–262.
Nicholson KE, Crother BI, Guyer C, Savage JM (2018) Translating a clade based classification into one that is valid under the international code of zoological nomenclature: the case of the lizards of the family Dactyloidae (order Squamata). Zootaxa 4461: 573–586. https://doi.org/10.11646/zootaxa.4461.4.7
Nolasco-Luna JR, López-Luna MA, Cupul-Magaña FG, Escobedo-Galván AH (2017 ["2016"]) Nuevos registros de anfibios y reptiles en la Isla María Cleofas, Nayarit. Ciencia y Mar 20 (58): 29–33.
Nolasco-Luna JR, Cupul-Magaña FG, Escobedo-Galván AH, Mata-Silva V, Wilson LD (2019) Rediscovery of *Tantilla bocourti* (Günther, 1895) on Isla María Cleofas, Nayarit, Mexico (Squamata: Colubridae). Herpetology Notes 12: 343–346.
O'Connell KA, Smith EN (2018) The effect of missing data on coalescent species delimitation and a taxonomic revision of whipsnakes (Colubridae: *Masticophis*). Molecular Phylogenetics and Evolution 127: 356–366. https://doi.org/10.1016/j.ympev.2018.03.018
Pennington JT, Mahoney KL, Kuwahara VS, Kolber DD, Calienes R, Chavez FP (2006) Primary production in the Eastern Tropical Pa-

cific: a review. Progress in Oceanography 69: 285–317. https://doi.org/10.1016/j.pocean.2006.03.012

Pérez-Higareda G, López-Luna MA, Smith HM (2007). Serpientes de la región de los Tuxtlas, Veracruz, México. Instituto de Biología, Universidad Nacional Autónoma de México, Ciudad de México, México, 189 pp.

Pliego-Sánchez JV, Blair C, Díaz de la Vega-Pérez AH, Jiménez-Arcos VH (2021): The insular herpetofauna of Mexico: composition, conservation, and biogeographic patterns. Ecology and Evolution 11: 6579–6592 https://doi.org/10.1002/ece3.7513

Ponce-Campos P, García Aguayo A (2007a) *Aspidoscelis communis*. The IUCN Red List of threatened species 2007: e.T64258A12759166.

Ponce-Campos P, García Aguayo A (2007b) *Leptophis diplotropis*. The IUCN Red List of threatened species 2007: e.T63840A12721094.

Ponce-Campos P, García Aguayo A (2007c) *Tantilla calamarina*. The IUCN Red List of threatened species 2007: e.T63938A12729941.

Ramírez-Bautista A (1994) Manual y clave ilustrada de los anfibios y reptiles de la región de Chamela, Jalisco, México. Cuadernos de Biología 23, Universidad Nacional Autónoma de México, Ciudad de México, México, 127 pp.

Ramírez-Bautista A, Wilson LD, Barriozabal-Islas C (2014) Morphological variation in a population of *Tantilla calamarina* Cope, 1866 (Squamata: Colubridae) from Guerrero, Mexico, and comments on fossoriality in the calamarina group and *Geagras redimitus*. Herpetology Notes 7: 797–805.

Ramírez-Reyes T, Blair C, Flores-Villela O, Piñero D, Lathrop A, Murphy R (2020) Phylogenomics and molecular species delimitation reveals great cryptic diversity of leaf-toed geckos (Phyllodactylidae: *Phyllodactylus*), ancient origins, and diversification in Mexico. Molecular Phylogenetics and Evolution 150: 1–18. https://doi.org/10.1016/j.ympev.2020.106880

Ramírez-Reyes T, Barraza-Soltero IK, Nolasco-Luna JR, Flores-Villela O, Escobedo-Galván AH (2021a) A new species of leaf-toed gecko (Phyllodactylidae, *Phyllodactylus*) from María Cleofas Island, Nayarit, Mexico. ZooKeys 1024: 117–136. https://doi.org/10.3897/zookeys.1024.60473

Ramírez-Reyes T, Flores-Villela O, Piñero D, Lathrop A, Murphy RW (2021b) Genomic assessment of the *Phyllodactylus tuberculosus* complex (Reptilia: Phyllodactylidae) in America. Zoologica Scripta 50: 529–542. https://doi.org/10.1111/zsc.12492

Rodríguez MC, Drummond H (2000) Exploitation of avian nestlings and lizards by insular milksnakes, *Lampropeltis triangulum*. Journal of Herpetology 34: 139–142.

Ruane S, Bryson Jr RW, Pyron RA, Burbrink FT (2014) Coalescent species delimitation in Milksnakes (genus *Lampropeltis*) and impacts on phylogenetic comparative analyses. Systematic Biology 63 (2): 231–250. https://doi.org/10.1093/sysbio/syt099

Santos-Barrera G, Flores-Villela O (2004) *Eleutherodactylus pallidus*. The IUCN Red List of threatened species 2004: e.T56822A11539667.

Santos-Barrera G, Hammerson G, Chaves G, Wilson LD, Bolaños F, Ponce-Campos P (2010) *Smilisca baudinii*. The IUCN Red List of threatened species 2010: e.T56006A11405400.

Senczuk G, García A, Colangelo P, Annesi F, Castiglia R (2014) Morphometric and genetic divergence in island and mainland populations of *Anolis nebulosus* (Squamata: Polychrotidae) from Jalisco (Mexico): an instance of insular gigantism. Italian Journal of Zoology 81: 204–214. https://doi.org/10.1080/11250003.2014.911973

Siliceo-Cantero HH, García A, Reynolds RG, Pacheco G, Lister BC (2016) Dimorphism and divergence in island and mainland anoles. Biological Journal of the Linnean Society 118: 852–872. https://doi.org/10.1111/bij.12776

Smith, HM (1943) Summary of the collections of snakes and crocodilians made in Mexico under the Walter Rathbone Bacon Traveling Scholarship. Proceeding of the United States National Museum 93 (3169): 393–504.

Smith HM, Taylor EH (1945) An annotated checklist and key to the snakes of Mexico. Bulletin of the United States National Museum 187: 1–139.

Stejneger L (1899) Reptiles of the Tres Marias and Isabel islands. North American Fauna 14: 63–71.

Wilson LD, Johnson JD, Mata-Silva V (2013a) A conservation reassessment of the amphibians of Mexico based on the EVS measure. Contribution to Special Mexico Issue. Amphibian and Reptile Conservation 7: 97–127.

Wilson LD, Mata-Silva V, Johnson JD (2013b) A conservation reassessment of the reptiles of Mexico based on the EVS measure. Contribution to Special Mexico Issue. Amphibian and Reptile Conservation 7: 1–47.

Wilson LD, Mata-Silva V (2014) Snakes of the genus *Tantilla* (Squamata: Colubridae) of Mexico: taxonomy, distribution, and conservation. Mesoamerican Herpetology 1: 4–95.

Woolrich-Piña GA, Ramírez-Silva JP, Loc-Barragán J, Ponce Campos P, Mata-Silva V, Johnson JD, García-Padilla E, Wilson LD (2016) The herpetofauna of Nayarit, Mexico: composition, distribution, and conservation status. Mesoamerican Herpetology 3: 375–448.

Wüster W, Yrausquin JL, Mijares-Urrutia A (2001) A new species of indigo snake from north-western Venezuela (Serpentes: Colubridae: *Drymarchon*). Herpetological Journal 11: 157–165.

Wyrtki K (1965) Surface currents of the Eastern Tropical Pacific Ocean. Inter-American Tropical Tuna Commission Bulletin 9: 271–303.

Zug GR (2013) Reptiles and amphibians of the Pacific islands: a comprehensive guide. University of California Press, Berkeley, USA, 306 pp.

Zweifel RG (1959) Snakes of the genus *Imantodes* in Western Mexico. American Museum Novitates 1961: 1–18.

Zweifel RG (1960) Results of the Puritan–American Museum of Natural History Expedition to western Mexico. 9. Herpetology of the Tres Marías islands. Bulletin of the American Museum of Natural History 119: 77–128.